

Geo-loc Server: User Plane and Control Plane capable with A-GPS for 2G,3G,4G LTE

For MNOs and PMRs

One of the most comprehensive LBS server (both SMLC for Control Plane methods and SLP for User Plane methods), providing real-time accurate Geo-localisation (some few meters with GPS) under one's own radio coverage with the Control Plane (RRLC and LPP) methods in any network visited by your subscribers with the User Plane Methods (needs the data GPRS service). Provides also the non GNASS methods, such as extended-Cell ID, U-TDOA, etc..

For the current migration of proprietary PMR LCS systems to 4G LTE, the 4G handsets can have the same behaviour as TETRA or TETRAPOL handsets.

1- Applications:

- subscriber's security: **lost or stolen handsets**,
- **personal security** while traveling in dangerous areas,
- **fleet or personnel real-time periodical positioning** for group calls.

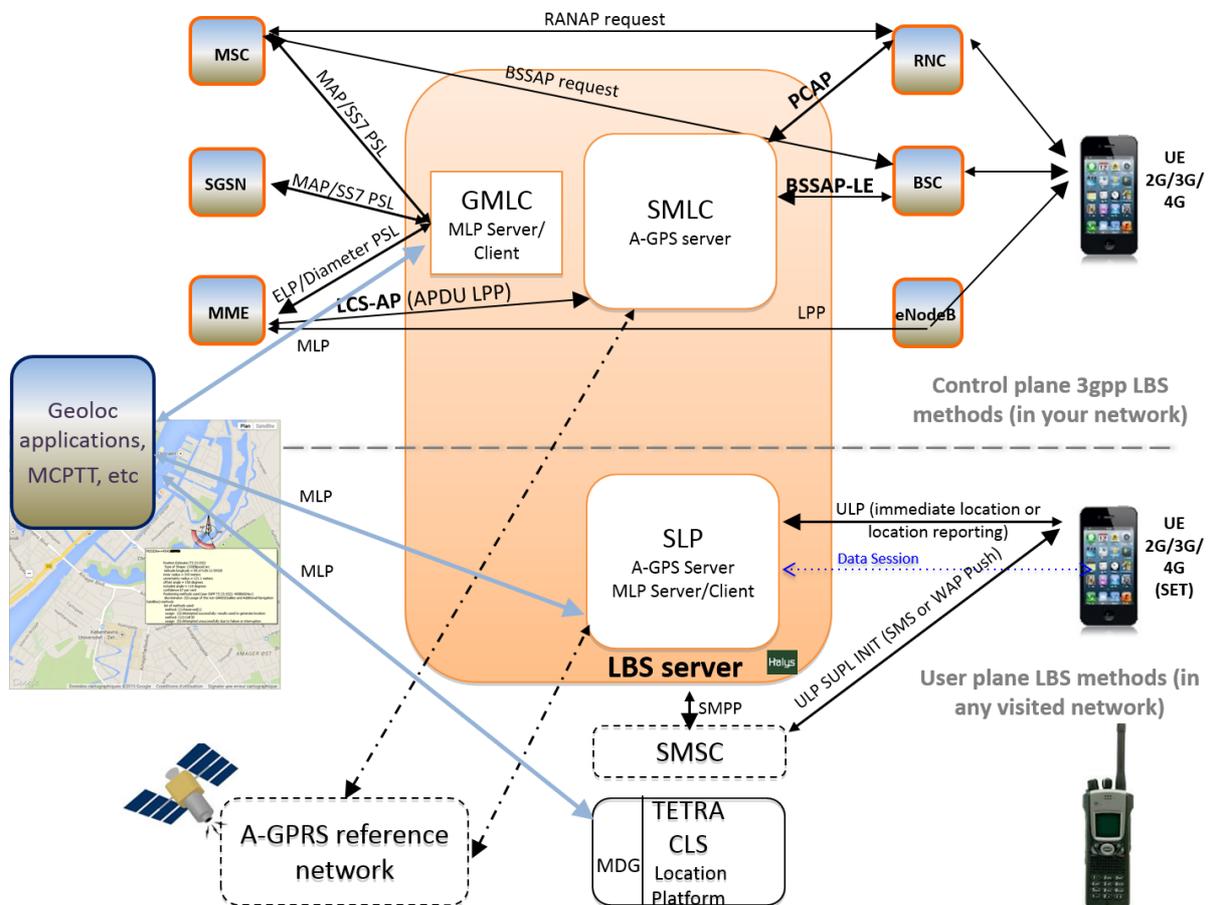


Fig 1- LBS server handling both LBS control plane methods and user plane methods

2- Applications interface

Use the standard OMA MPL V3 (HTTP soap) interface with the MCPTT command centre or the fleet management system (TETRAPOL or TETRA compatible) with:

- network initiated location requests,
- mobile initiated location requests (positioning on maps),
- periodical or area trigger based location reports to provide directly regular positions to the MCPTT for group management.

3- A-GPS server characteristics

The Halys system allows to access A-GPS receiver stations that receive and broadcast the satellite ephemeris and almanac and convert to the industry standard format to be used for A-GPS. The Assist GPS mode allows to reduce the position time of an initialized handset from several minutes to a few seconds time compatible with the max response time of the RRC, RRLC or LPP(4G) protocols.

4- Anonymity protection

With other A-GPS enabled LBS services (google, apple, nokia, etc...) the IMSI is transmitted to an uncontrolled third party allowing to correlate the user Identity and the geo-localisation. With the Halys LBS any access to the A-GPS reference network uses a random identity.

5- Control plane methods

The SMLC interfaces with BSS, GERAN or UTRAN LMUs, or eNodeBs receives elements of location measurements and computes the position of the mobile phone and its accuracy.

Halys provides the support of multiple measurements methods to be selected with regards to the radio infrastructure and the needed accuracy:

- Cell-Id (Basic positioning "Cell centric")
- Extended Cell-Id (increased accuracy with Timing Advance)
- Extended Cell-Id (TA+ measurement report + of angle of arrival)
- U-TDOA (with LMU providing accuracy smaller than 100m)
- Assisted GPS (A-GPS) (for a precision of few meters)

6- Halys Gateway Mobile Location Centre (GMLC) for CP methods

The GMLC browser interface is provided which displays the map of the subscriber location. IP interface allows external LBS services to retrieve the locations and accuracy (fleet management, find your friends, etc.)

Compliance

3GPP TS 49.031 BSSAP-Location Services Extension 2G SMSC-RNC

3GPP TS 29.171 SLs LCS-AP Application Protocol SMLC-MME

3GPP TS 29.172 SLg Interface GMLC - MME

3GPP TS 29.002 Lg Interface GMLC- MSC

OMA TS MLP V3 Mobile Location Protocol (applications interfaces)

OMA TS ULP V2 User Plane Location Protocol

Technical Data:

Stand alone Linux OS on Intel Servers or Virtual Machines connected as a WEB service for the User Plane method. SS7 connection for the Control Plane method.

Licensing: Pay-as-you-grow positioning method accuracy and transaction capacity license based